

# EXHIBIT A

**UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF TEXAS  
AUSTIN DIVISION**

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In re CASSAVA SCIENCES, INC.  
SECURITIES LITIGATION

Master File No. 1:21-cv-00751-DAE

**SURREPLY REBUTTAL REPORT OF**

**PROFESSOR STEVEN P. FEINSTEIN, PH.D., CFA**

October 16, 2024

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## I. SCOPE OF PROJECT AND REPORT

1. Plaintiffs' Lead Counsel, Robbins Geller Rudman & Dowd LLP, asked me to determine whether the common stock and exchange-traded options of Cassava Sciences, Inc. ("Cassava" or the "Company") traded in efficient markets during the period from 14 September 2020 through 12 October 2023, inclusive (the "Class Period"), and whether a common methodology exists for calculating Class-wide damages in this case.
2. On 13 March 2024, I submitted a report in this matter (the "Feinstein Report").<sup>1</sup> Based on the analyses presented in the Feinstein Report, I concluded that the common stock and options of Cassava traded in efficient markets throughout the Class Period.<sup>2</sup> I further concluded that Section 10(b) damages can be computed for all Class members and for all securities using a common methodology that is consistent with Plaintiffs' theory of liability, and I described that methodology.<sup>3</sup>
3. In the Feinstein Report, I found that each of the *Cammer* and *Krogman* factors supports a conclusion that the market for Cassava stock was efficient throughout the Class Period.<sup>4</sup> As explained and documented in the Feinstein Report, analysis of the *Cammer* and *Krogman* factors, including empirical event-study analysis, is the generally accepted methodology for assessing market efficiency.<sup>5</sup> My analysis included these statistical tests, which compared the price behavior of Cassava stock on high-information flow dates to the stock price movements on more ordinary non- or lesser-news dates. The tests proved that Cassava stock responded to new, Company-specific information and thereby demonstrated market efficiency during the Class Period.<sup>6</sup>

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<sup>1</sup> Unless otherwise indicated, capitalized terms used herein have the same definition and meaning ascribed to them in the Feinstein Report and Feinstein Rebuttal Report.

<sup>2</sup> Feinstein Report, ¶21.

<sup>3</sup> Feinstein Report, ¶22 and §XI.

<sup>4</sup> Feinstein Report, ¶¶18-20, and 186.

<sup>5</sup> Feinstein Report, §VI.B.

<sup>6</sup> Feinstein Report, ¶¶174, 178, 181, and 185.

4. The Feinstein Report also explained that options are derivative of and designed to respond to movement in the underlying stock's price, such that if the stock price rises, the call option prices will also rise and the put option prices will fall, all else held equal.<sup>7</sup> Similarly, if the stock price falls, the call option prices will fall and the put option prices will rise, all else held equal.
5. The Feinstein Report noted that the Cassava options were traded on the Chicago Board Options Exchange (CBOE) and benefited from the same information infrastructure that made the Cassava stock market efficient. By virtue of their design and the highly developed information dissemination and option trading infrastructure, because Cassava stock traded in an efficient market, so too did the Cassava options.<sup>8</sup>
6. I empirically tested whether the Cassava options responded to information as did the Cassava stock. The event study tests examined the price behavior of Cassava options, combined in a way that permitted valid regression estimation and event study *t*-tests. The tests compared option price movements on high information flow dates to the option price movements on the more ordinary non- or lesser-news dates. The Cassava options demonstrated market efficiency during the Class Period, observably reacting to information, and thus satisfied the fifth *Cammer* factor.<sup>9</sup> I therefore concluded that the Cassava options traded in an efficient market throughout the Class Period.<sup>10</sup>
7. Following submission of the Feinstein Report, on 14 June 2024 I provided deposition testimony in this case (the "Feinstein Deposition").
8. Following the Feinstein Deposition, I submitted a rebuttal report dated 23 August 2024 (the "Feinstein Rebuttal Report"), in which I addressed the arguments and opinions in the Expert Report of René M. Stulz, Ph.D., dated 28 June 2024 (the "Stulz Report") and the Deposition of René M. Stulz, Ph.D., taken 8 August 2024 (the "Stulz Deposition"). In the

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<sup>7</sup> Feinstein Report, ¶188.

<sup>8</sup> Feinstein Report, ¶¶187-191, and 216.

<sup>9</sup> Feinstein Report, ¶217.

<sup>10</sup> Feinstein Report, ¶¶21, and 216-218.

Feinstein Rebuttal Report, I concluded that Dr. Stulz's arguments and opinions provided no reason to revise any of the conclusions in the Feinstein Report.<sup>11</sup>

9. Following the submission of the Feinstein Rebuttal Report, I received the Expert Surreply Report of René M. Stulz, Ph.D., dated 4 October 2024 ("Stulz Surreply"), submitted by Defendants in this matter.<sup>12</sup> In the Stulz Surreply, Dr. Stulz states that I misrepresented his testimony, he offers clarification to his prior arguments, and he presents new arguments, new test results, and new purported evidence.<sup>13</sup> As explained herein, none of Dr. Stulz's revisions, clarifications, or new purported evidence validate his prior arguments or cause me to modify my conclusions.
10. This rebuttal report presents my analysis and conclusions relating to the Stulz Surreply and the issues, arguments, and new purported evidence raised therein.
11. That this rebuttal report may not address and/or respond to all the arguments and opinions expressed in the Stulz Surreply should not be considered a tacit acceptance of any of Dr. Stulz's opinions.

## **II. RESPONSE TO THE STULZ SURREPLY**

12. The Stulz Surreply provides no reason to revise my conclusions in the Feinstein Report, or any basis for withdrawing my criticisms of the Stulz Report presented in the Feinstein Rebuttal Report. Dr. Stulz is wrong to contend that I mischaracterized his opinions, analysis, and the literature.<sup>14</sup> Indeed, I presented verbatim excerpts from his reports, articles, deposition, and the literature in the Feinstein Rebuttal Report.
13. **Informational market efficiency.** The Stulz Surreply is wrong to assert that I inaccurately defined market efficiency. In the previous Stulz Report, Dr. Stulz states that my description of market efficiency in the Feinstein Report accords with the semi-strong form of market

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<sup>11</sup> Feinstein Rebuttal Report, ¶29.

<sup>12</sup> The Stulz Report, Stulz Deposition, and Stulz Surreply are referred to collectively herein as "Dr. Stulz's Testimony."

<sup>13</sup> Stulz Surreply, ¶4.

<sup>14</sup> Stulz Surreply, ¶4.

efficiency that is addressed extensively in the finance literature.<sup>15</sup> He did not take issue with my operative definition of market efficiency. Nowhere in the Stulz Report does Dr. Stulz argue that the Feinstein Report's description and characterization of market efficiency "has no basis in financial economics."<sup>16</sup> Now, in the Stulz Surreply, he incorrectly contends that (i) informational market efficiency is a concept that is ungrounded in financial economics, and (ii) the Feinstein Report's market efficiency definition is tautological and indicates that the market is always correct.<sup>17</sup> When Dr. Stulz incorrectly states that my definition of market efficiency is nothing more than a security reacting to new information,<sup>18</sup> he conflates the generally accepted, objectively testable, empirical *indicator* of market efficiency (i.e., the security reacts to new valuation-relevant information) with the *definition* of market efficiency (i.e. publicly available information is promptly incorporated into the security price such that the trading price reflects that information). Dr. Stulz gives no indication as to why he now suddenly believes that the Feinstein Report mischaracterizes market efficiency, despite his prior agreement with my definition. This is a new opinion that Dr. Stulz offers, not a response to the Feinstein Rebuttal Report. Not mutually exclusive.

14. As described in the Feinstein Report, the relevant definition of market efficiency is "a market in which publicly available information is incorporated into the price of a security such that the trading price reflects publicly available information with reasonable promptness."<sup>19</sup> This is what I test for, and this is what I find.
15. Dr. Stulz's reference to other definitions and forms of market efficiency is a red herring, irrelevant, and not a valid criticism of my analysis. There is indeed a three-part taxonomy of types of market efficiency based on the type of information prices may reflect. Weak-form means the price reflects all past price and volume data, such as any information that may be gleaned from chart analysis. Semi-strong means that the price reflects all publicly

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<sup>15</sup> Stulz Report, ¶31.

<sup>16</sup> Stulz Surreply, ¶5.

<sup>17</sup> Stulz Surreply, ¶¶5-6 and 14-24.

<sup>18</sup> Stulz Surreply, ¶6.

<sup>19</sup> Feinstein Report, ¶65.

available information. Strong-form is theoretical construct that means market prices also reflect private inside information. Clearly, semi-strong form is the relevant version from this taxonomy that is relevant for a securities case. However, this three-part taxonomy does not imply that there are not also two kinds of market efficiency based on whether a security's price promptly incorporates new information (informational efficiency) versus whether a security's price always conforms to a particular pricing model (fundamental efficiency). The existence of the taxonomy does not preclude the dichotomy. Semi-strong and informational are not mutually exclusive forms of market efficiency. The form of efficiency relevant for a class action securities case is both semi-strong and informational.

16. I ran the generally accepted and widely used tests of market efficiency that have been endorsed in the literature and by courts.<sup>20</sup> These tests included an empirical analysis to address Dr. Stulz's concerns that the so-called "meme stock phenomenon" may have influenced Cassava stock and options. The Cassava stock and options reacted promptly to new information, and they therefore empirically demonstrated that they traded in efficient markets.<sup>21</sup>
17. As I stated in the Feinstein Rebuttal Report:

"Dr. Stulz's thesis thus suffers from a definitional flaw. Conformity of a stock price to the correct price according to a particular valuation model (a discounted cash flow model, for example) is fundamental market efficiency, not informational efficiency. Informational efficiency does not require that a stock be bound to what a particular valuation model deems is the correct price, but rather requires that the stock respond to and impound new information the market deems to be relevant. A stock whose valuation is impacted by changing market sentiment, changes in the supply of shares made available for trading, or its addition to a security market index, for example, will still be informationally efficient, as long as it also reacts to and impounds economically material information."

**Feinstein Rebuttal Report, ¶112 (internal citations removed).**

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<sup>20</sup> Feinstein Report, ¶¶57-66, and 129.

<sup>21</sup> Feinstein Report, ¶¶19-21, 185, and 217; and Feinstein Rebuttal Report, ¶¶3 and 6.

18. Contrary to Dr. Stulz's newfound protestations in the Stulz Surreply, the concept of informational market efficiency is grounded and discussed in the finance literature. For example:

“If financial markets cannot be fully efficient, how efficient are they? That proves to be a very hard question to answer. After 50 years of research, the best answer remains, ‘we don’t know,’ but there is a caveat. That caveat involves distinguishing between what is called informational efficiency and fundamental efficiency. A market is said to be informationally efficient if it responds quickly to significant new information. The evidence in favor of informational efficiency of financial markets is overwhelming. A prime example is the response to earnings announcements. When a company either exceeds or falls short of expected earnings by a meaningful amount, the company’s stock price typically responds within seconds. Such quick responses are not limited to company-specific news. Major macroeconomic announcements such as a sharp unexpected movement in inflation have an immediate impact on stock prices. The same is true of unexpected political events such as 9/11.”

*The Conceptual Foundations of Investing*, by Bradford Cornell et al., John Wiley & Sons, Inc., 2018, pp. 34-35.

19. Dr. Stulz protests that he did not admit that the markets for Cassava stock and options were efficient.<sup>22</sup> But he did. In his deposition, he admitted not only that Cassava stock reacted to company-related information, but also that he expected it to.<sup>23</sup> Despite his regretting his testimony post-deposition, his testimony was an admission that the markets for the Cassava Securities were efficient during the Class Period.

20. **Dr. Stulz tries to have it both ways.** Dr. Stulz professes that he is not claiming Cassava was a so-called “meme stock” or that such stocks are necessarily inefficient.<sup>24</sup> He claims that this argument is a straw man of my own invention.<sup>25</sup> However, the bulk of Dr. Stulz’s Testimony is designed to suggest exactly that Cassava was a “meme stock” and that such stocks are inefficient. If, in fact Dr. Stulz is disclaiming this thesis, and thus admitting that

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<sup>22</sup> Stulz Surreply, ¶9.

<sup>23</sup> Stulz Deposition at 318:15 – 323:23, and 328:18 – 330:12.

<sup>24</sup> Stulz Surreply, ¶7.

<sup>25</sup> Stulz Surreply, ¶¶7-8.

Cassava is neither a “meme stock” nor traded in an inefficient market, there is not much else left of his opinion in dispute.

21. Dr. Stulz minces words to argue that although Cassava may have not been a “meme stock,” it may nonetheless have been impacted by the “meme stock phenomenon” which could make it trade inefficiently. This argument founders because, though there is no accepted definition of a “meme stock,” Cassava was not a meme stock using the criteria suggested by Dr. Stulz. Any Cassava attributes that were similar to so-called “meme stock” attributes were similar only on account of factors other than the meme stock phenomenon. For example, Cassava’s stock price was volatile during the Class Period because of Defendants’ alleged fraud and the controversy about Cassava’s value that raged during the Class Period.<sup>26</sup> Cassava had short interest, yes, but that was because respected members of the scientific community distrusted and spoke out against Cassava’s purportedly successful Simufilam trials.<sup>27</sup> The range between Cassava’s low and high stock prices was wide, but that was because, as analysts pointed out, the Company’s valuation depended on a wide range of future prospects.<sup>28</sup> Given Cassava was not a “meme stock,” and Dr. Stulz does not say it was, there is simply no justification to assert that it was subject to the meme stock phenomenon. Nor is there justification to conclude that the so-called “meme stock phenomenon” caused or may have caused Cassava’s Securities to be inefficient, especially given Dr. Stulz did not find that there was a coordinated effort to affect the Cassava stock price or a short squeeze on Cassava’s stock during the Class Period.<sup>29</sup>
22. Dr. Stulz wishes to differentiate between the so-called meme stock phenomenon, which he says is new, and noise trading, which is not.<sup>30</sup> But he offers no compelling support for any distinction. Instead, he argues that noise trading, too, could make a market inefficient.<sup>31</sup>

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<sup>26</sup> See e.g., “Simufilam + Cog Data + Shifting Alzheimer’s Disease Landscape = Growing Opportunity; Raising PT to \$80,” by Jason McCarthy, Maxim Group, analyst report, 16 February 2021, p. 4.

<sup>27</sup> “Alzheimer’s Scientists Critique Cassava Sciences’ Study Results – Overblown, Inappropriate, Uninterpretable,” by Adam Feuerstein, *STAT+*, 30 July 2021.

<sup>28</sup> Feinstein Rebuttal Report, ¶121.

<sup>29</sup> Feinstein Rebuttal Report, ¶123.

<sup>30</sup> Stulz Surreply, ¶29.

<sup>31</sup> Stulz Surreply, ¶31.

Dr. Stulz disregards that noise trading has been an understood element in financial markets at least since the 1970s, but markets nonetheless have been generally considered to almost always be efficient.<sup>32</sup>

23. While Dr. Stulz contends that only empirical testing can discern whether a stock in a well-developed market behaved inefficiently on account of the so-called meme stock phenomenon,<sup>33</sup> I conducted that empirical testing and found that Cassava stock and options efficiently reacted to new value-relevant company information.<sup>34</sup> Even if there may have been social media attention paid to Cassava stock, and high short interest, these attributes did not prevent Cassava stock and options from reacting to new company information, as is demonstrated in the empirical tests I ran. Dr. Stulz's efforts to draw a distinction between a stock being a meme stock and a stock being influenced by the meme stock phenomenon are thereby also futile.<sup>35</sup> If a stock demonstrates that it behaved efficiently in an empirical test, as is the case here, any such distinction is irrelevant. Cassava stock and options empirically demonstrated that their markets were efficient.<sup>36</sup>
24. Given Dr. Stulz is not opining that Cassava was a meme stock, his extensive exposition on meme stocks and the so-called meme stock phenomenon is misleading and moot, and has no impact on the well founded conclusion that the markets for Cassava stock and options were efficient during the Class Period.
25. **Dr. Stulz's emphasis on volatility.** As he did in his first report, Dr. Stulz describes Cassava's large stock price movements and volatility.<sup>37</sup> Here, Dr. Stulz is not responding to my rebuttal, but rather is reiterating his old argument that I already addressed. I explained that there was great uncertainty in the market for Cassava stock on account of Cassava being an early-stage biotechnology company whose fortunes heavily depended on the

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<sup>32</sup> Feinstein Rebuttal Report, ¶72.

<sup>33</sup> Stulz Report, ¶¶17-19, 42, and 51-69.

<sup>34</sup> Feinstein Rebuttal Report, ¶¶14 and 61.

<sup>35</sup> Stulz Surreply, ¶8.

<sup>36</sup> Feinstein Report, ¶¶19-20, 185, and 217-218; and Feinstein Rebuttal Report, ¶¶3 and 6.

<sup>37</sup> Stulz Surreply, ¶¶19-22.

success of Simufilam.<sup>38</sup> In this context, the Cassava stock and option price movements were perfectly understandable, as the market responded to negative and positive news including the Company's alleged misrepresentations.

26. In the Stulz Surreply, just as in the Stulz Report, Dr. Stulz suggests that Cassava's large stock price movements and wide range of prices during the Class Period were perhaps irrational and not justified.<sup>39</sup> He continues to ignore that the range of stock prices during the Class Period was supported mathematically by equity analysts covering Cassava at the time. With a wide range of potential futures, the Company had a wide range of potential valuations. To wit, former CEO Barbier said at the time that the Company could "be the next 'Google or Tesla'" while critics countered that the Company's research was of no value at all, such as one Alzheimer's disease researcher and physician calling Cassava's Simufilam trial results "uninterpretable."<sup>40</sup>
27. Dr. Stulz further argues that Cassava stock price movements may have underreacted or overreacted to information disclosures.<sup>41</sup> Not only does he provide no proof to support his supposition, but such an argument would have to assume the correctness of some particular alternative valuation model contrary to the consensus valuation model reflected in the market price. Note that Dr. Stulz does not argue that the market would have ignored the important information, just that the market would have valued that information differently than how he subjectively would have. This is not a valid criticism of informational efficiency, and the U.S. Supreme Court in *Halliburton II* recognized as much.

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<sup>38</sup> Feinstein Rebuttal Report, ¶¶91-93.

<sup>39</sup> Stulz Surreply, ¶¶19-22; and Stulz Report, ¶¶70-78.

<sup>40</sup> "Jordan Thomas's Army of Whistle-Blowers," by Patrick Keefe, *New Yorker*, 17 January 2022; and "Alzheimer's Scientists Critique Cassava Sciences' Study Results – Overblown, Inappropriate, Uninterpretable," by Adam Feuerstein, *STAT+*, 30 July 2021.

<sup>41</sup> Stulz Surreply, ¶18.

“Even the foremost critics of the efficient-capital-markets hypothesis acknowledge that public information generally affects stock prices. ... Debates about the precise *degree* to which stock prices accurately reflect public information are thus largely beside the point. ‘That the ... price [of a stock] may be inaccurate does not detract from the fact that false statements affect it, and cause loss,’ which is ‘all that *Basic* requires.’”

*Halliburton Co. v. Erica P. John Fund, Inc.*, 573 U.S. 258, 272 (2014) (emphasis in original; internal citations omitted).

28. **Dr. Stulz’s emphasis on high short interest.** Dr. Stulz contends that high short interest *may* have made the market for Cassava Securities inefficient.<sup>42</sup> While impediments to short selling could potentially hinder negative information from entering the market and cause a security’s price to be stuck upward, here, Dr. Stulz ignores the fact that Cassava stock was not stuck upward. In fact, he concedes that the stock moved frequently and widely, both up and down.<sup>43</sup> He also admits that there was no short squeeze.<sup>44</sup> Dr. Stulz also disregards that short interest rose throughout the Class Period, proving that during the Class Period additional shorting was always possible.<sup>45</sup>
29. While Dr. Stulz himself and peer-reviewed published articles have explained that put options are a substitute for short selling and mitigate the effects of a short selling constraint, he now contends that this alternative does not necessarily offset the effects of short sale constraints on market efficiency.<sup>46</sup> First, Dr. Stulz has not proved that there was a short sale constraint in Cassava stock, and the evidence indicates there was none as observed above. Second, the reason why a short-sale constraint could potentially affect market efficiency is remedied here by put options. Investors with negative information can bring that negative information to the market via put options.<sup>47</sup>

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<sup>42</sup> Stulz Surreply, ¶¶9 and 23.

<sup>43</sup> See, e.g., Stulz Surreply, ¶¶21-22, 51, and footnote 110.

<sup>44</sup> Feinstein Rebuttal Report, ¶¶123-124; and Stulz Deposition at 174:5 – 20.

<sup>45</sup> Feinstein Rebuttal Report, ¶187.

<sup>46</sup> Stulz Surreply, ¶¶9 and 23-24.

<sup>47</sup> Feinstein Rebuttal Report, ¶188; and “Should We Fear Derivatives?” by Rene Stulz, *Journal of Economic Perspectives*, Vol. 18, No. 3, 2004, p. 180.

30. Dr. Stulz says that a short-sale constraint could slow the incorporation of new information, he does not say it would prevent that incorporation.<sup>48</sup> Ultimately, Dr. Stulz acknowledges that, at most “short-sale constraints would cause stock prices to incorporate new, value-relevant public information more slowly.”<sup>49</sup> By his own admission, such a constraint (which did not exist in the case of Cassava stock) would not make the market inefficient, as the security price would still “incorporate new, value-relevant public information.”<sup>50</sup>

31. **Dr. Stulz ignores the empirical demonstrations of the option market efficiency.** Dr. Stulz wrongly asserts that I only assumed the Cassava options behaved efficiently based on theoretical principles.<sup>51</sup> He disregards, however, that I tested the proposition empirically and the Cassava options behaved efficiently.<sup>52</sup>

32. **Dr. Stulz eschews generally accepted principles of statistical inference.**<sup>53</sup> He might wish it not to be true, but it is consistent with a generally accepted principle of statistical inference that a significant reaction to new information demonstrates market efficiency while non-statistical significance is not evidence of inefficiency. That a dispositive result proves a proposition but an indeterminate result does disprove the proposition is a generally accepted principle taught in beginner-level statistics textbooks.<sup>54</sup> By analogy, when fishing, catching a fish proves there are fish in a lake. Not catching a fish does not prove there are no fish in the lake. Applying the analogy, the statistically significant reactions of Cassava stock and options to new, valuation-relevant information did prove: (i) the markets were well developed, (ii) there were no apparent impediments to information flow, (iii)

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<sup>48</sup> Stulz Surreply, ¶9.

<sup>49</sup> Stulz Surreply, ¶9.

<sup>50</sup> Stulz Surreply, ¶9.

<sup>51</sup> Stulz Surreply, ¶10.

<sup>52</sup> Feinstein Report, ¶217; and Feinstein Rebuttal Report, ¶6.

<sup>53</sup> Stulz Surreply, ¶11.

<sup>54</sup> “We should emphasize that if the null hypothesis [ $H_0$ ] is not rejected, based on the sample data, we cannot say that the null hypothesis is true. To put it another way, failing to reject the null hypothesis does not prove that  $H_0$  is true, it means we have *failed to disprove*  $H_0$ .” *Statistical Techniques in Business and Economics*, by Robert D. Mason et al., 10th Edition, McGraw-Hill, 1999, p. 307 (emphasis in original).

investors were able to trade on information, and (iv) traders did trade on information and the security prices reacted accordingly. Moreover, I explained in the Feinstein Rebuttal Report why certain dates Dr. Stulz highlighted would not elicit statistically significant reactions. I also proved that nearly all of the days Dr. Stulz claimed had no important news did in fact have important news that would cause the Cassava Security prices to move. That stocks trading in an efficient market typically have large significant price movements due to random volatility and in the absence of publicly known news is a generally accepted proposition grounded and explicated in the finance literature.<sup>55</sup>

33. Dr. Stulz erroneously argues that my position in the current matter is inconsistent with the position I took in “the Brief for Financial Economists as Amici Curiae Supporting Respondents filed in *Goldman v. Arkansas Teacher Ret. System* on March 3, 2021 that event studies are among the ‘industry-standard’ economic tools that economists use to disprove price impact.”<sup>56</sup> Dr. Stulz’s critique is false. The *Goldman* brief explained that “trained economists use hard economic data and accepted economic tools to determine the concrete effect of a statement or omission on share price. These tools include ***event studies***, content analysis, valuation models, and an examination of ‘comparable’ events, among others.”<sup>57</sup> Thus, the brief explained that the event study analysis would be one of many different tools used to assess price impact, and unlike Dr. Stulz’s approach, the event study results would be evaluated holistically in conjunction with these other analyses.
  
34. **Dr. Stulz’s failed event study.** In the Stulz Surreply, Dr. Stulz tries to rehabilitate his fatally flawed social media event study.<sup>58</sup> His effort fails. In the Feinstein Rebuttal Report, I showed that nearly all the days on which Dr. Stulz said there was no news, there actually

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<sup>55</sup> Feinstein Rebuttal Report, ¶125. In addition to “R2,” by Richard Roll, *The Journal of Finance*, Vol. 43, No. 2, 1988 cited in the Feinstein Rebuttal Report; *see also, e.g.*, “What Moves Stock Prices?” by David Cutler, James Poterba, and Lawrence Summers, *The Journal of Portfolio Management*, Vol. 15, No. 3, Spring 1989.

<sup>56</sup> Stulz Surreply, ¶62, and footnote 130.

<sup>57</sup> Brief for Financial Economist as *Amici Curiae* Supporting Respondents, *Goldman Sachs Group, Inc., et al., v. Arkansas Teacher Retirement System, et al.*, Supreme Court of the United States, No. 20-222, March 2021, p. 8. (emphasis added).

<sup>58</sup> Stulz Surreply, ¶¶33-44.

was news.<sup>59</sup> For example, I explained that on 5 February 2021 a Citi Research analyst’s cautionary research note was published pertaining to the Cassava trial results released on 2 February 2021.<sup>60</sup> Dr. Stulz, meanwhile, said there was no “new, value-relevant information to explain the statistically significant residual return” on February 5<sup>th</sup>.<sup>61</sup> In the Stulz Surreply, Dr. Stulz argues that the Citi Research report was repetitive of *another* analyst firm who published a report on 2 February 2021.<sup>62</sup> Dr. Stulz’s retort is farcical: if one analyst states his opinion on one day, and then two days later another analyst expresses a similar view, then that second opinion would stand on its own and the concurrence by another analyst is new news. The analysts’ agreement about cautiously interpreting the 2 February 2021 clinical trial results denotes that while some market participants were optimistic, others were less so.

35. In the Feinstein Rebuttal Report, I also noted that Dr. Stulz agrees that there was news on three of the 10 high social media days he identified (18 September 2020, 30 July 2021, and 20 September 2022).<sup>63</sup> In the Stulz Surreply, Dr. Stulz “acknowledge[s] that new public information about Cassava may have entered the market” and that he “identified news that may, in part, have contributed to the stock price reaction on these dates.”<sup>64</sup> Despite admitting that these three days contained new information that moved the Cassava stock price, Dr. Stulz continues to argue that there were 10 high social media days with statistically significant movements and no information, even though he recognizes that three of those days did have news. Dr. Stulz is unwilling to admit that the realization that his no-news days actually did have news not only supports market efficiency, but also undermines the reliability of his social media analysis and the conclusion he draws from it.
36. The remaining number of statistically significant days in Dr. Stulz’s group of days studied (approximately 5%) is what one would expect when the threshold for significance is set to

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<sup>59</sup> Feinstein Rebuttal Report, §§IV.C.3.b-c.

<sup>60</sup> Feinstein Rebuttal Report, ¶150.

<sup>61</sup> Stulz Report, ¶82.

<sup>62</sup> Stulz Surreply, ¶37.

<sup>63</sup> Feinstein Rebuttal Report, ¶¶140-143, 161-164, and 167-170.

<sup>64</sup> Stulz Surreply, ¶44, and footnote 97.

the 5% significance level (corresponding to the 95% confidence level).<sup>65</sup> In the Feinstein Rebuttal Report, I explained that stock price movements that are statistically significant at the 95% confidence level can occur by random chance alone 5% of the time. Thus, out of 34 tested days, one would expect one or two such days where it appears that the stock is moving by a statistically significant amount in the absence of news. This should occur even in an efficient market, as the result stems from the design of the significance test.<sup>66</sup> Dr. Stulz is wrong to suggest that his observation of statistically significant movements on two of 34 dates is a higher percentage than would be expected based on random chance. The results of Dr. Stulz's own study are perfectly consistent with Cassava stock and options behaving efficiently, and not being influenced by a so-called meme stock phenomenon.

37. Dr. Stulz adheres to his misconception that there was no important news on 21 July 2021.<sup>67</sup> This was the day that the title of the Company's poster presentation at the upcoming AAIC conference was announced. That presentation title stated that clinical results had proved the mechanism underlying the efficacy of Simufilam worked.<sup>68</sup> In an about face, now aware of the announcement the Company made that day while he was unaware of it when he wrote the Stulz Report, Dr. Stulz now asserts that his reason for still maintaining that that there was no new information that day is because no analysts commented on the published title of the poster session that announced the purportedly positive information to be released at the AAIC.<sup>69</sup> Analyst commentary is not a necessary requirement for a piece of news to be considered important. As there was great uncertainty in the marketplace about whether Simufilam would ultimately prove commercially viable, even short unadorned announcements, such as the poster title announcement, can have a significant effect. How Dr. Stulz can say that an announcement the Simufilam's underlying mechanism worked was not important news is mystifying.

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<sup>65</sup> Feinstein Rebuttal Report, ¶152.

<sup>66</sup> Feinstein Rebuttal Report, ¶166.

<sup>67</sup> Stulz Surreply, ¶¶39-40.

<sup>68</sup> Feinstein Rebuttal Report, ¶¶155-160.

<sup>69</sup> Stulz Surreply, ¶¶39-40.

38. Dr. Stulz unsuccessfully tries to cover for one of the fatal flaws in his so-called social media event study – failing to control for social media mentions that occurred after the close of trading on his event days.<sup>70</sup> In the Feinstein Rebuttal Report, I pointed out that Dr. Stulz erred by choosing and evaluating high social media days on the basis of a measure of mentions that included mentions made after the close of trading, which could not possibly have had an effect on the prior closing price of Cassava stock.<sup>71</sup> In a footnote in the Stulz Surreply, Dr. Stulz claims to have rerun his test to correct his mistake.<sup>72</sup> He asserts that fixing the mistake does not “change the *qualitative* results of [his] test.”<sup>73</sup> Dr. Stulz seems to admit implicitly that fixing the mistake did produce different quantitative results, but he does not provide those new quantitative results for inspection. Because this new purported evidence is not supported by clear articulation and presentation of the quantitative inputs or outputs, it is impossible to evaluate, much less verify. Dr. Stulz has no valid basis for any conclusion from his fundamentally flawed study. Moreover, while he tries to fix this one of his mistakes, he still does not correct for the even more fatal flaw, which is that his supposed “no news days” actually had economically material news.

39. **Social Media Can Enhance Market Efficiency.** Dr. Stulz misrepresents the literature regarding the impact of social media on markets.<sup>74</sup> The literature I cited concluded that social media brings information to the market and therefore promotes market efficiency.<sup>75</sup> Studies have found that social media can bring information to the market, and can sometimes do so more quickly than other media. Dr. Stulz is wrong to say that this function is inconsistent with market efficiency, and he cites no evidence or support for this assertion.

40. Nor does Dr. Stulz consider the risk-reward tradeoff one faces if one were to try to profit by trading on the information disseminated by social media. Contrary to Dr. Stulz’s opinion

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<sup>70</sup> Stulz Surreply, ¶¶45-47.

<sup>71</sup> Feinstein Rebuttal Report, ¶177.

<sup>72</sup> Stulz Surreply, footnote 102, pp. 20-21.

<sup>73</sup> Stulz Surreply, ¶47 (emphasis added).

<sup>74</sup> Stulz Surreply, ¶32.

<sup>75</sup> Feinstein Rebuttal Report, ¶34.

expressed in the Stulz Surreply, there is nothing in the literature I cited that is incompatible with market efficiency.

41. **The Cassava options traded in an efficient market.** As explained in the Feinstein Report and the Feinstein Rebuttal Report, the design of options is derivative and links them structurally to the underlying stock.<sup>76</sup> It is a generally accepted principle of finance that options move with the underlying stock price. My analysis confirmed that this relationship holds true also for the Cassava options.<sup>77</sup> Therefore, because the Cassava stock traded in an efficient market, with the Cassava stock price reacting to new Company information, the Cassava options also traded in an efficient market.
42. Dr. Stulz contends that while I explain that theoretical linkage, I do not demonstrate the link “for the Cassava options specifically.”<sup>78</sup> In fact, I do. I showed that the movements in the synthetic stock prices constructed from the Cassava options were statistically significant on virtually all of the same event days when the Cassava stock price movements were statistically significant.<sup>79</sup>
43. Dr. Stulz incorrectly contends I mischaracterize the Figlewski [1989] article.<sup>80</sup> While Figlewski pointed out market frictions that could impact the ability to execute arbitrage transactions, notwithstanding these frictions options still do conform generally to the Black-Scholes option model, which links option prices to the price of the underlying stock.

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<sup>76</sup> Feinstein Report, ¶216; and Feinstein Rebuttal Report, §IV.E.

<sup>77</sup> Feinstein Report, ¶215; and Feinstein Rebuttal Report, ¶253.

<sup>78</sup> Stulz Surreply, ¶55.

<sup>79</sup> Feinstein Report, ¶19-21; and Feinstein Rebuttal Report, ¶250.

<sup>80</sup> Stulz Surreply, ¶55, and footnote 115.

“Among all theories in finance, the Black-Scholes option pricing model has perhaps had the biggest impact on the real world of securities trading. Virtually all market participants are aware of the model and use it in their decision making. Academics regularly test the model’s valuation on actual market prices and typically conclude that, while not every feature is accounted for, ***the model works very well*** in explaining observed option prices.”

“Options Arbitrage in Imperfect Markets,” by Stephen Figlewski, *The Journal of Finance*, Vol. 44, No. 5, 1989, pp. 1289-1290 (emphasis added).

44. The conclusion of the Figlewski [1989] article is the opposite of what Dr. Stulz would have one believe. The article shows that despite the common market frictions Dr. Stulz points to, it is a generally accepted principle that the option pricing model works and options track their underlying stock, not just in theory, but in the real world. The frictions do not prevent the model from working and therefore do not prevent the option markets from being informationally efficient.
45. Dr. Stulz quibbles with my characterization of his criticism concerning the collective options event study and analysis.<sup>81</sup> In the Feinstein Rebuttal Report, I stated that Dr. Stulz’s “complaint with respect to my options analysis is that I conducted the analysis for all Cassava option contracts collectively, rather than examining each of the 15,016 different specifications individually.”<sup>82</sup> In his protestation, Dr. Stulz clarifies that his point is not that, but rather that I did not “address ***clear heterogeneity between options series.***”<sup>83</sup> This seems to be the same point, cast differently. Dr. Stulz saying the same thing with different words is evidence that I did not mischaracterize what he said. Further, Dr. Stulz’s insistence that all Cassava option series be studied individually is inconsistent with academic literature, including the academic literature he himself cited in the Stulz Report.<sup>84</sup>
46. Dr. Stulz points out again in the Stulz Surreply that the bid-ask spread for some Cassava ***options*** were wide compared to typical bid-ask spreads for ***stocks.***<sup>85</sup> But, he overlooks my

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<sup>81</sup> Stulz Surreply, ¶56.

<sup>82</sup> Feinstein Rebuttal Report, ¶39.

<sup>83</sup> Stulz Surreply, ¶56 (emphasis added).

<sup>84</sup> Feinstein Rebuttal Report, ¶40.

<sup>85</sup> Stulz Surreply, ¶58.

rebuttal, which is that his seemingly high measure of bid-ask spread is on account of option prices being low compared to their underlying stock prices.<sup>86</sup> Dr. Stulz also fails to consider my observation that options are an economical alternative to investing in the underlying stock, not a more expensive alternative, and that the option bid-ask spreads are narrow if measured relative to the price of the underlying stock.<sup>87</sup> Dr. Stulz further errs by not considering that measured his way, options on virtually all stocks would have seemingly high bid-ask spreads, but it is still generally accepted that options track their underlying stocks nonetheless. Including in the case of Cassava.

47. There are other aspects of the Cassava bid-ask spread that Dr. Stulz fails to consider. Option bid-ask spreads during Class Period were influenced by the Defendants' conduct. Cao and Han [2013] found that the bid-ask spread will increase on account of high volatility. Dealers charge higher transactions costs to make a market in options on volatile stocks.<sup>88</sup> So, the very volatility that Defendants injected into the market with the misrepresentations and omissions is what Dr. Stulz and Defendants now try to hide behind in their market efficiency arguments. Since Cao and Han [2013] say that higher volatility elicits wider bid-ask spreads, the bid-ask spreads we observe are a rational response to the injected volatility according to Cao and Han [2013], not evidence of inefficiency.
48. Dr. Stulz also fails to consider that the option series he identifies as having high bid-ask spreads are mostly relic option series that are deep out-of-the-money and do not represent the Cassava options market as a whole. As the Feinstein Rebuttal Report found, the correlation between Cassava stock returns and Cassava synthetic stock returns during the Class Period was 99.77%, even including these relic options contracts – compelling proof that the synthetic stock (and the options constructing the synthetic stock) tracked the actual stock. This indicates, therefore, that Cassava's options reacted to the same information as Cassava stock, and any noise or deviations introduced into the synthetic stock price from bid-ask spreads had negligible effect.<sup>89</sup>

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<sup>86</sup> Feinstein Rebuttal Report, ¶217.

<sup>87</sup> Feinstein Rebuttal Report, ¶¶217-218.

<sup>88</sup> "Cross Section of Option Returns and Idiosyncratic Stock Volatility," by Jie Cao and Bing Han, *Journal of Financial Economics*, Vol. 108, No. 1, April 2013.

<sup>89</sup> Feinstein Rebuttal Report, ¶253.

49. **The damages methodology is sufficiently detailed.** Dr. Stulz does not argue that the virtually universally used out-of-pocket damage methodology is inappropriate in this case or cannot be feasibly implemented. Instead, he argues that I have not articulated the model and its implementation to his subjective satisfaction.<sup>90</sup> Not so. The methodology computes the spread between what the security price actually was and what it would have been with full disclosure. There is no dispute about what the security prices actually were. The valuation of the but-for prices with full disclosure would be conducted in accordance with generally accepted valuation principles using all available valuation tools.

50. This is not the first time Dr. Stulz or the Defendants he works for criticized an out-of-pocket damages methodology as insufficiently detailed at the certification stage of a class action security case. They have done so numerous times. Their argument is almost always rejected, as courts recognize that (i) the certification stage is premature for finer details, (ii) full development of the record will determine which valuation tools are necessary, and (iii) it is inappropriate to speculate about potential valuation complexities that have not yet been encountered.

51. Despite his protestations, Dr. Stulz does not dispute that a common damages methodology, consistent with the Plaintiffs' theory of liability exists and can be applied to compute damages for all investors who purchased Cassava Securities during the Class Period. He accepts that the out-of-pocket damage methodology exists, is consistent with Plaintiffs' theory of liability, and would be implemented commonly for all Class members.<sup>91</sup> He simply argues that issues could potentially be encountered that could cause a damages expert to implement the methodology incorrectly. This is not a valid criticism of my damage methodology opinion.

52. In the Stulz Surreply, Dr. Stulz no longer argues that (i) I am required at this stage of the litigation to link the corrective disclosures to specific misrepresentations,<sup>92</sup> (ii) I did not sufficiently explain how the methodology would deal with confounding information if

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<sup>90</sup> Stulz Surreply, ¶12.

<sup>91</sup> Stulz Surreply, ¶3.

<sup>92</sup> Feinstein Rebuttal Report, ¶¶277-281.

hypothetically confounding information was encountered,<sup>93</sup> and (iii) I did not sufficiently explain how the methodology would deal with time-varying inflation if that issue were hypothetically encountered.<sup>94</sup>

53. In his latest iteration, Dr. Stulz argues that “the biggest challenge in this case”<sup>95</sup> is whether the residual stock price declines following corrective disclosure can be used to measure damages because the stock price declines following corrective disclosure events may hypothetically reflect the “abatement of the impact from the meme stock phenomenon.”<sup>96</sup>

“Dr. Feinstein has not established that the residual price declines on alleged corrective disclosure dates can be reliably used to estimate either the inflation removed on that day, or the inflation earlier in the Proposed Class Period.”

**Stulz Surreply, ¶65 (emphasis removed).**

54. Once again, it is premature to explain how the damages methodology might deal with any and every issue that hypothetically might potentially be encountered. Further, it is entirely speculative to suppose hypothetically that there may be any price impact from the so-called meme stock phenomenon that would have to be controlled for. Dr. Stulz admits he is not opining that Cassava was a meme stock,<sup>97</sup> nor has he proved that the so-called meme stock phenomenon had any effect on the Cassava stock price.

55. Essentially, Dr. Stulz’s critique is not that a common damages methodology does not exist or that it cannot be applied to measure damages commonly for all investors. Rather, Dr. Stulz cautions that care must be taken to avoid mistakes when applying the methodology that he concedes exists. This is not a valid criticism of the damage methodology.

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<sup>93</sup> Feinstein Rebuttal Report, ¶¶282-293; and Stulz Report, ¶¶170-171, and §§IX.B- IX.C.

<sup>94</sup> Feinstein Rebuttal Report, ¶¶297-308; and Stulz Report, ¶172, and §IX.D.

<sup>95</sup> Stulz Surreply, ¶64. Dr. Stulz argues that “Dr. Feinstein creates and criticizes strawman *arguments that I did not make*, rather than respond to the opinions that I did offer. For example, with respect to the efficiency of Cassava’s stock Dr. Feinstein claims *that I offer the ‘misguided’ opinion that ‘a) Cassava was a ‘meme stock;’ b) meme stocks are inefficient; c) therefore, Cassava stock was inefficient.’*” (Stulz Surreply, ¶7 emphasis added).

<sup>96</sup> Stulz Report, ¶196; and Stulz Surreply, §VII.

<sup>97</sup> Stulz Surreply, ¶7.

### **III. LIMITING FACTORS AND OTHER ASSUMPTIONS**

56. This report is furnished solely for the purpose of court proceedings in the above-referenced matter and may not be used or referred to for any other purpose. The analysis and opinions contained in this report are based on information available as of the date of this report. I reserve the right to amend, refine, or supplement this report in the event that I become aware of additional information, evidence, arguments, or analyses which bear on my work in this matter.



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Steven P. Feinstein, Ph.D., CFA

**Exhibit-1**

**Documents and Other Information Considered  
In Addition to Those Cited in the Feinstein Report and Feinstein Rebuttal Report**

**CASE DOCUMENTS**

- Rebuttal Report of Professor Steven P. Feinstein, Ph.D., CFA, dated 23 August 2024.
- Affidavit of Scott Campbell, dated 4 October 2024.
- Expert Surreply Report of Rene M. Stulz, Ph.D., dated 4 October 2024.

**ACADEMIC AND PROFESSIONAL LITERATURE**

- Cao, Jie, and Bing Hang, “Cross Section of Option Returns and Idiosyncratic Stock Volatility,” *Journal of Financial Economics*, Vol. 108, No. 1, 2013.
- Cornell, Bradford, Shaun Cornell, and Andrew Cornell, *The Conceptual Foundations of Investing*, John Wiley & Sons, Inc., 2018.
- Cutler, David, James Poterba, and Lawrence Summers, “What Moves Stock Prices?” *The Journal of Portfolio Management*, Vol. 15, No. 3, 1989.
- Mason, Robert, Douglas Lind, and William Marchal, *Statistical Techniques in Business and Economics*, 10<sup>th</sup> Edition, McGraw-Hill, 1999.

**OTHER LEGAL CASE DOCUMENTS**

- Brief for Financial Economist as *Amici Curiae* Supporting Respondents, *Goldman Sachs Group, Inc., et al., v. Arkansas Teacher Retirement System, et al.*, Supreme Court of the United States, No. 20-222, March 2021.

**OTHER**

- Any other documents cited in the report.

**Exhibit-2**

**Steven P. Feinstein, Ph.D., CFA**  
**Testimony Subsequent to the Feinstein Rebuttal Report**

In re Cassava Sciences, Inc. Securities Litigation  
Master File No. 1:21-cv-00751-DAE  
United States District Court  
Western District of Texas  
Austin Division  
Deposition Testimony  
September 2024

In re Waste Management Securities Litigation  
Civil Action No. 1:22-cv-04838-LGS  
United States District Court  
Southern District of New York  
Deposition Testimony  
September 2024